REMARKS

Interview

Applicants thank Examiner Lee for his time and consideration in the personal interview held on October 3, 2003. The following remarks and the attached Declaration are consistent with the comments and suggestions at the interview.

Status of the Claims

Claims 1-3, 5-7 and 10-15 are pending in this application. No claims have been canceled, added or amended. Applicants submit that following arguments and Declaration in support of the allowability of the claims.

Rejection under 35 USC 103(a)

The Examiner maintains the rejection of claims 1-3, 5-7 and 10-15 as obvious over USP 6,433,062 to Tasaka et al. (Tasaka '062) in view of USP 5,221,781 to Aida et al. (Aida '781). Applicants traverse the rejection and respectfully request the withdrawal thereof.

Present Invention

The present invention is directed to a fire-retardant resin composition and a molded article using the said composition, which have excellent characteristics, such as resistance to whitening when bent, mechanical strength (e.g. tensile strength), flexibility and abrasion resistance. The present invention is prepared by heating and kneading a metal hydrate surface-treated in a specific ratio with a specific silane coupling agent having a vinyl group or an epoxy group at its terminal, together with a thermoplastic resin component in a given amount, in the presence of a peroxide, at a temperature equal to or higher than the melting temperature of the thermoplastic resin component. See page 37, lines 3-8 of the present specification.

The present invention has such remarkable characteristics because the metal hydrate surface is treated with a specific silane coupling agent in a given ratio, including treatment of all of the metal hydrate. The metal hydrate and the resin components are bonded to each other via the silane coupling agent. Therefore, when heating and kneading the mixture of the metal hydrate and the resin components in the presence of a peroxide, the extrusion processibility is not deteriorated even when a large amount of

metal hydrate is added. Excellent mechanical properties and abrasion-resistance are achieved by the specific components. See page 39, lines 7-24 of the present specification.

In the present invention, the specific silane coupling agent is limited to one having an epoxy group or a vinyl group at its terminal. The action and effect, or mechanism of the specific silane coupling agent are described in the specification. The specific silane coupling agent that has been bonded to the metal hydrate surface as a result of the treatment with the specific silane coupling agent acts such that the alkoxy group at one terminal is bonded to the metal hydrate including the vinyl group and the epoxy group being present at the other terminal are bonded to the uncrosslinked parts of the ingredient (a) of a vinyl aromatic thermoplastic elastomer, and the ingredient (c) of an ethylene/α-olefin copolymer synthesized in the presence of a single site catalyst. Thus, a large amount of a metal hydrate can be added without impairing extrudability, the adhesion between the resin and the metal hydrate is made strong, and a fire-retardant resin composition that is good in mechanical strength and abrasion resistance and that is difficulty scarred can be obtained. See page 39, lines 9-24 of the present specification.

Cited Prior Art

Aida '781 discloses surface treatment of an inorganic filler with several surface treatment agents. See column 6, lines 11-17. Aida '781 discloses several surface treatment agents; silane coupling agent is merely listed among one of several examples of the surface treatment agents. Silane coupling agent is not specifically discussed or distinguished from other surface treatment agents listed therein. Further, no particular acts or effects of the silane coupling agent are described or discussed in Aida '781.

As such, Applicants submit that no motivation exists to select the specific silane coupling agent from the laundry list of agents. Pursuant to MPEP 2143.01, there must be some objective teaching in the reference or in the general knowledge in the art to select the specific surface treatment agent so as to arrive at the present invention. No such motivation exists.

Moreover, Applicants submit that there are inconsistent teachings between the present invention and the disclosure in Aida '781. The substances to be surface-treated in Aida '781 are not "inorganic flame retardant" (such as $Mg(OH)_2$ in the present invention) but ---inorganic fillers--- as described at column 6, line 11 of Aida '781. As such, one of ordinary skill in the art

would not be motivated to select the silane coupling agent as the surface treatment agent for treating an inorganic flame retardant as opposed to treating inorganic filler.

Moreover, Applicants submit that Aida '781 fails to describe or suggest the unexpected superior composition of the invention obtained using the specific silane coupling agent at a specific ratio, which has the properties of improved whitening resistance, mechanical strength, flexibility and abrasion resistance, and which is well-balanced in these properties.

Aida '781 illustrates the invention of Aida '781 in the Examples. The Examples disclose a magnesium hydroxide treated by an aliphatic acid (trade name, Kisma 5B) as a metal hydrate. See Examples 15, 16, 17, 18, 20, 21 and 22 at column 12, lines 34-36 of Aida '781. On the other hand, in the present specification, Applicants compare the present invention with the illustrative example in Aida '781. See Comparative Example 1 where a magnesium hydroxide is treated by an aliphatic acid (Kisma 5B). The test results are described in the specification.

In addition to the above, Applicants also submit a Declaration under Rule 132 to further explain the results of the comparative tests in the present specification. Example 1, the present invention, was prepared in the same manner as Comparative Example 1

except that in Example 1 magnesium hydroxide whose surface had been treated with a vinyl silane (B-1) was used, and in Comparative Example 1 magnesium hydroxide whose surface had been treated with an aliphatic acid (B-2) was used. See Table B on page 6 of the Declaration.

From the thus-obtained resin compositions of Example 1 and Comparative Example 1, 1-mm-thick sheets were formed, respectively, as described in lines 11 to 13 on page 55 of the present specification.

In addition, from the resin compositions of Example 1 and Comparative Example 1, insulated wires were prepared, respectively, as described in lines 14 to 22 on page 55 of the present specification.

As to the thus-obtained sheets, the tensile properties (extension (elongation) (%) and tensile strength (MPa)) and the heat deformation property were tested and evaluated in the same manner as described in lines 19 to 24 on page 56 of the present specification. The results are shown in Table B.

As to the thus-obtained insulated wires, the tensile properties, the abrasion resistance, the horizontal flame test, the 60°-inclined flame test, the heat deformation rate test, the whitening test (if a whitening phenomenon was observed when bent),

the extrudability test, and the flexibility test were carried out, to test and evaluate the covering layers of each insulated wire in the same manner as described in from line 4 on page 57, to line 3 on page 61 of the present specification. The results are also shown in Table B.

Further, for reference, the resin compositions and results exhibited by the sheets and wires prepared from the compositions, shown in Table A in the Declaration Under 37 C.F.R. § 1.132 dated April 18, 2003, were excerpted and are again shown in Table B below (Comparative example 101 and Example 10). Example 10 contained the metal hydrate (B) {i.e. B-1 and B-2} in a relative amount of 163 parts by weight to 100 parts by weight of the thermoplastic resin component (A) (i.e., {a + b+ c-1 +(d-1 or d-2)}), and more than half the amount of the metal hydrate (B) was made up of $Mg(OH)_2$ pretreated with a silane coupling agent having a vinyl group at its terminal (B-1). Comparative example 101 contained the same amount of the metal hydrate (B). However, in Comparative example 101, less than half the amount of the metal hydrate (B) was made up of $Mg(OH)_2$ pretreated with such a silane coupling agent (B-1).

As is apparent from the results shown in Table B, the sheets prepared from the compositions of Examples 1 and 10 according to

the present invention exhibited unexpected superior results with respect to tensile strength, as compared to the sheets prepared from the compositions of Comparative Examples 1 and 101.

Further, as is apparent from the results shown in Table B, the insulated wires prepared by employing the compositions of Examples 1 and 10 according to the present invention exhibited unexpected superior results in tensile strength and whitening, as compared to the insulated wires prepared by employing the compositions of Comparative Examples 1 and 101.

The excellent whitening characteristics are not merely aesthetic, but are indicative of physical properties of a product, such as a wire or a molded plug. For instance, the whitening phenomenon is influenced by the flexibility of the product when being bent. If conspicuous whitening occurs to a product when bent, then this is a sign that the insulating cover made of the resin composition may be damaged and can cause a serious problem and compromise the integrity of the cover.

It is believed that the distinct difference caused between the excellent properties as exhibited in Example 1 and the poor properties as shown in Comparative Example 1 is due to the difference in the surface-treatment (pretreatment) of the metal hydrate either by the specific silane coupling agent having a

reactive group such as a vinyl group or an epoxy group at its terminal (in Example 1) or by the aliphatic acid (in Comparative Example 1) not being as reactive as the specific silane coupling agent of the present invention.

Furthermore, in Example 1, the present invention, all of the magnesium hydroxide was treated by the specific silane coupling agent. Likewise, in Comparative Example 1 in the present specification, all of the magnesium hydroxide was treated by an aliphatic acid, just as in Aida '781. Comparing Example 1 to Comparative Example 1, each of the following properties and the balance thereof: resistance to whitening, mechanical strength, flexibility and abrasion resistance of the products in Example 1 are demonstrated to be remarkably superior to those in Comparative Example 1.

In addition, in Example 10 of Mr. Kobayashi's Declaration, a specific amount or ratio of the metal hydrate was surface-treated with the specific silane coupling agent. The results also exhibited unexpected superior results as compared to Comparative Example 101, in which an amount or ratio (but outside the range defined in the present invention) of the metal hydrate was surface-treated with the specific silane coupling agent.

The effects or mechanism of the specific silane coupling agent for use in the present invention, namely as surface treatment agents, is different from the use of treatment agents as disclosed in Aida '781. In Aida '781, the agents are used only for the purpose of improvement in dispersibility of fillers. "For the improvement of dispersibility, these fillers may be subjected to a surface treatment using, for example, a silane coupling agent, an organic titanate-based coupling agent, or a metallic salt of a fatty acid." (See column 6, lines 13-17 in Aida '781.)

In the present invention, the specific silane coupling agent is utilized not merely for the improvement of dispersibility, but for the improvement of various performances other than dispersibility. The purpose of using the specific silane coupling agent and its resultant effects in the present invention quite differ from those in Aida '781.

Further, in the present invention, the specific silane coupling agent is selected from various silane coupling agents, a metallic hydrate is surface-treated by using the said specific silane coupling agent, combining the metallic hydrate with thermoplastic resin component via the silane coupling agent, and various excellent performances stated above are obtained. These

resultant performances are never disclosed and even suggested in Aida '781. As such, the disclosure in Aida '781 is deficient.

The primary reference fails to disclose or suggest treating the surface of a metal hydrate with the specific silane coupling agent of the present invention. Tasaka '062 also fails to disclose the organic peroxide crosslinking agent. In view of the deficiencies in Tasaka '062, Applicants submit that the combination of Tasaka '062 and Aida '781 fail to make the present invention obvious.

Conclusion

Applicants submit that no prima facie case of obviousness has been established as there is no motivation for one of ordinary skill in the art to select the specific silane coupling agent from the laundry list disclosed in Aida '781. And, even if a prima facie case of obviousness has been established, Applicants submit that the present invention, which used a metal hydroxide surface treated with a specific silane coupling agent at a specific ratio has unexpected superior properties over the combination of teachings in the cited art.

Therefore, as Applicants have addressed and overcome all rejections in the Office Action, Applicants respectfully request that the rejections be withdrawn and that the claims be allowed.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Kecia Reynolds (Reg. No. 47,021) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

Pursuant to the provisions of 37 C.F.R. §§ 1.17 and 1.136(a), the Applicants hereby petition for an extension of three (3) months to December 12, 2003 in which to file a reply to the Office Action. The required fee of $950.00 is being filed concurrently with the Notice of Appeal.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees

required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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Attachment: Declaration of Kazuhiko Kobayashi